

Artillery, who has given a masterly discussion of not only longitudinal but also lateral stability, and has arrived at a large number of important simple and practical conclusions relating to both the conditions of stability and the trajectories of aeroplanes the motion of which is stable. The paper constitutes by far the most important recent advance in the study of artificial flight.

MESSRS. PERCIVAL MARSHALL AND CO. have published a popular essay entitled "Electric Power. What it is and what it can do," by Mr. Alfred W. Marshall. The price of the pamphlet is 3d. net.

MR. NASARVANJI JIVANJI READYMONEY has issued a revised edition of his "Nature-history Museum and Descriptive defining Nature-history Tables," the first edition of which was noticed in our issue for March 30, 1905. Several changes and additions have been made in this painstaking piece of work.

Nos. 16, 17, and 18 of "Materials for a Flora of the Malayan Peninsula," by Sir George King, F.R.S., and Mr. J. Sykes Gamble, F.R.S.—which Messrs. West, Newman and Co., of Hatton Garden, are reprinting from the *Journal of the Asiatic Society of Bengal*—have been received. In addition to an account of the rubiaceae genus *Psychotria*, the first fasciculus contains descriptions of the Malayan members of eleven natural orders, including 48 genera and 81 species, of which two genera and 17 species are new to science. The second of the present parts describes five natural orders, Myrsinaceæ, Sapotaceæ, Ebenaceæ, Styraceæ, and Oleaceæ. These five orders comprise 24 genera and 221 species. There are no new genera, but the number of new species reaches 103. The last of the three instalments deals with nine natural orders containing 53 genera and 150 species, none of which are described for the first time. Among the orders of which accounts are given may be mentioned Boraginaceæ, Convolvulaceæ, Solanaceæ, Scrophulariaceæ, and Lenticulariaceæ. When all the fasciculi are available, we hope to review the complete work.

THE Cambridge University Press is publishing, under the title of "Cambridge Tracts in Mathematics and Mathematical Physics," a series of short works on various topics in pure mathematics and theoretical physics. The chief purpose of the undertaking is to assist in the maintenance of a high standard in English mathematical teaching by the continued infusion of new methods and more accurate modes of treatment, and by the extension of knowledge of recent mathematical research. The first of the series, a tract on "Volume and Surface Integrals used in Physics," by Mr. J. G. Leathem, has already been published, and a second, on "The Integration of Functions of a Single Variable," by Mr. G. H. Hardy, will be issued very shortly. The Press has also ready for immediate publication a new and revised edition, in one volume, of Prof. A. E. H. Love's "Treatise on the Mathematical Theory of Elasticity," and a third edition of Prof. Horace Lamb's "Hydrodynamics."

THE fourth year-book, that for 1905, of the Carnegie Institution of Washington has been received. The titles alone of the publications bearing upon the work done under grants from the institution fill eight closely printed pages, and it is impossible here to do more than direct attention to a few of the researches of outstanding importance. Prof. G. E. Hale, as director of the solar observatory at Mount Wilson, California, provides an excellent illustrated account of the astrophysical work done at Mount

Wilson under his supervision. Prof. Lewis Boss, director of the Dudley Observatory, Albany, New York, describes his investigations of stellar motion. Mr. Charles B. Davenport, who is in charge of the station for experimental evolution at Cold Spring Harbour, New York, classifies the work in progress there, which is largely what he describes as of the "time-consuming" order, and gives a full report, with illustrations and results, of the experiments conducted during the year. Marine biology is well represented in the year-book by Mr. A. G. Mayer's account of what has been accomplished in connection with the laboratory at Tortugas, Florida. This report includes contributions from the numerous experts working in the laboratory. Several investigators were at work in the Desert Botanical Laboratory, Tucson, Arizona, and substantial progress in numerous directions was made during the year. Prof. T. C. Chamberlin, of the University of Chicago, continues his contributions to solutions of the fundamental problems of geology, and gives a full discussion of the deformations of the earth and of climatic oscillations. Mr. Bailey Willis, of the U.S. Geological Survey, describes his geological studies in Europe, and his attempts to determine the geographical condition of each continent at successive geological epochs. The magnetic survey of the North Pacific Ocean, undertaken by the U.S. Department of Research in Terrestrial Magnetism, and carried out by Mr. J. E. Pratt's party in the *Galilee*, is described by Dr. L. A. Bauer. These annual reports should be a source of gratification to Mr. Carnegie, and it is to be desired that wealthy men in this country could be led to follow an excellent example in the direction of encouraging scientific research and providing for the publication of results.

#### OUR ASTRONOMICAL COLUMN.

COMET 1905c (GIACOBINI).—The following is a continuation of the ephemeris published in No. 4067 of the *Astronomische Nachrichten* by Herr A. Wedemeyer:—

		Ephemeris 12h. M.T. Berlin.			
1906		$\alpha$ (true)	$\delta$ (true)	$\log r$	$\log \Delta$
		h. m. s.	° ' "		
Feb 8	...	23 31 16	... -21° 9'	9.7704	... 0.0694
10	...	23 49 14	... -19 40	9.8058	... 0.0755
12	...	0 5 58	... -18 7	9.8379	... 0.0830
14	...	0 21 33	... -16 33	9.8672	... 0.0918
16	...	0 36 3	... -14 59	9.8942	... 0.1016
18	...	0 49 32	... -13 26	9.9192	... 0.1123

The accompanying chart shows, approximately, the apparent path of the comet among the stars from

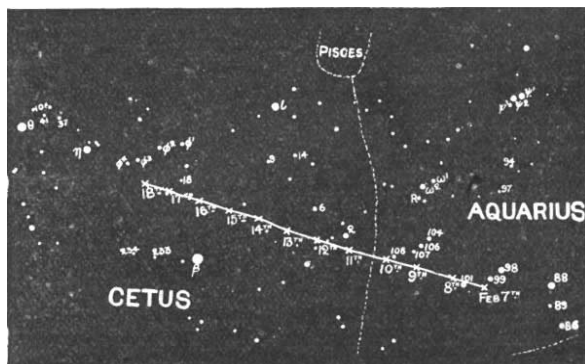


FIG. 1.—Apparent path of Comet 1905 c (Giacobini), February 7–18, 1906.

February 7 to February 18, according to the above ephemeris.

Although still fairly bright, the comet is a difficult object

owing to its close proximity to the sun, and should be looked for immediately after sunset in the south-west quadrant, near to the horizon.

COMET 1906a.—Numerous observations of the new comet discovered by Mr. Brooks at Geneva, U.S.A., have been made, and from the positions determined on January 28, 29, and 30, the following elements and an ephemeris, of which a part is given below, have been calculated by Messrs. Crawford and Champreux:—

Elements.

T = 1905 Dec. 19.47 G.M.T.

$$\begin{aligned} \infty &= 86.22 \\ \Omega &= 285.27 \\ i &= 126.49 \\ q &= 1.2826 \end{aligned} \quad \left. \vphantom{\begin{aligned} \infty \\ \Omega \\ i \\ q \end{aligned}} \right\} 1906.0$$

Ephemeris 12h. G.M.T.

1906	h.	m.	$\delta$	Brightness
Feb. 8	...	15 50.4	... +70° 37'	... 1.04
" 12	...	15 05.9	... +78° 37'	... 1.05

Brightness at time of discovery = 1.0.

Thus it will be seen that the comet is now travelling due north, and is easily circumpolar, but it is in a better position for observations after midnight (Kiel *Circular*, No. 85).

A NEW METHOD OF DETERMINING THE MOON'S POSITION PHOTOGRAPHICALLY.—The chief difficulty in photographically recording the moon's position among the stars, for the purpose of determining the errors in the ephemeris, arises from the fact that if the exposures be long enough to record the faint, surrounding stars, the moon's image is tremendously over-exposed, and the star images are lost in the light-fog caused by the prevailing moonshine. Several methods of overcoming this difficulty have been proposed, and Mr. Wade, of the Helwan Observatory, Egypt, now suggests another, which, from his preliminary experiments, promises to be successful.

In this method the camera is mounted so that its optical axis passes horizontally through the centre of an ordinary cœlost, but the mirror of the latter, instead of being worked to a true plane, is figured as a prism, the two faces of which are inclined at an angle of  $7\frac{1}{2}^\circ$ , and the edge of the prism is arranged parallel to the polar axis. Thus the photograph obtained includes two fields which are, actually, separated by  $15^\circ$  in right ascension.

The cœlost is arranged so that one face of the prism reflects the moon's image into the camera, whilst the other face reflects the field of stars situated about 1 hour in right ascension from the moon, and therefore beyond the range of strong moonlight. Then the reflected lunar image is intercepted whilst the reflected star images are exposed for  $2\frac{1}{2}$  minutes, when an instantaneous exposure on the moon is made. The operation is completed by exposing the star-field for a second  $2\frac{1}{2}$  minutes. By this method Mr. Wade has obtained a number of successful negatives with a 2-inch visual achromatic Dallmeyer lens and a cœlost of 4 inches diameter (*Monthly Notices Royal Astronomical Society*, vol. lxvi., No. 2).

A CATALOGUE OF SPECTROSCOPIC BINARIES.—A novel and important catalogue, published by the Lick Observatory as Bulletin No. 79, has just been received. It contains all the known particulars of the orbits of the spectroscopic binary stars discovered prior to January 1, 1905.

On that date 140 of these objects were known, 72 of them having been discovered by the Lick observers and 41 at the Yerkes Observatory.

When one remembers that the first of these interesting objects,  $\zeta$  Ursæ Majoris, was discovered by Prof. Pickering so recently as 1889, it becomes evident that this field of research is likely to contain ample scope for further work; therefore in order to simplify matters for future observers Prof. Campbell and Dr. H. D. Curtis have collected all the known results into the present catalogue. In addition to the positions, magnitudes, spectral types, and orbital details of the binaries, the catalogue contains a valuable column in which the name of the discoverer

and references to the bibliography of each binary, together with brief notes, are given.

OBSERVATIONS OF THE LYRID METEORS, APRIL, 1904.—In No. 4067 of the *Astronomische Nachrichten* Dr. Jiří Kaván, of the Prag-Smichow Astronomical Institute, gives the results of his observations of the Lyrids on April 18, 19, 20, and 21, 1904.

Forty-five meteors were observed, twenty of them being recorded between 12h. 5m. and 15h. 25m. (M.E.T.) on April 19. From an analysis of the records, Dr. Kaván has deduced two radiant points for this shower as follows:—

- (1)  $\alpha = 278.0$  ...  $\delta = +30.5$  (near  $\beta$  Lyrae)  
(2)  $\alpha = 247.0$  ...  $\delta = +31.5$  (near  $\zeta$  Herculis).

# REPORT OF THE MEETING OF THE SOLAR COMMISSION AT INNSBRUCK.

THE commission was constituted by the following action of the Southport meeting of the International Meteorological Committee thus reported:—

"Discussion of the relation of meteorology to astrophysics."

"The members of the Committee had previously taken part in a discussion of this subject at a meeting of Section A of the British Association; and Mr. Shaw proposed that a Commission should be appointed to review and discuss meteorological observations from the point of view of their connection with solar physics. Mr. Shaw's motion was adopted, and MM. Lockyer, Shaw, Pernter, and Angot were elected to serve on this Commission with power to add to their number and to elect their officers."

The following is the list of those who have been appointed members of this commission up to the present time:—

- M. A. Angot, Bureau Central Météorologique, Paris.  
Prof. H. J. Ångström, University, Upsala.  
Geheimrat oberregierungs von Bezold, Berlin.  
M. Teisserenc de Bort, Observatoire de Trappes, prés Paris.  
Prof. F. H. Bigelow, Weather Bureau, Washington.  
Prof. Birkeland, University of Christiania.  
Rev. G. R. Cirera, S.J., Observatorio del Ebro, Tortosa, Spain.  
Dr. W. G. Davis, Oficina Meteorologica Argentina, Cordoba, Argentine Republic.  
M. H. Deslandres, Observatoire d'Astronomie physique, Meudon, Seine et Oise.  
Sir John Eliot (secretary), 79 Alleyn Park, Dulwich, London; Bon Porto, Cavalaire, Var, France.  
Mr. G. E. Hale, Solar Observatory, Mount Wilson, California, U.S.A.  
Hofrat Prof. Dr. J. Hann, 19 Hohe Warte, Vienna, Austria.  
M. M. S. Hepites, Institut Météorologique, Bucarest, Roumania.  
M. Janssen, Observatoire d'Astronomie physique, Meudon, Seine et Oise.  
Prof. W. H. Julius, Rijks Universiteit, Utrecht, Holland.  
Hofrat. Prof. Dr. N. Thege v. Konkoly, k. meteor. Reichsanstalt, Budapest.  
Prof. Dr. W. Köppen, Seewarte, Hamburg.  
Mr. S. P. Langley, Secretary of the Smithsonian Institution, Washington, U.S.A.  
Sir Norman Lockyer (president), Solar Physics Observatory, South Kensington, London.  
Dr. W. J. S. Lockyer, Solar Physics Observatory, South Kensington, London.  
Captain J. H. Lyons, R.E., Survey Department, Cairo, Egypt.  
M. E. Marchand, Observatory, Pic du Midi.  
Prof. H. Mohn, Meteorologische Institut, Christiania.  
Hofrat. Prof. Dr. J. M. Pernter, Hohe Warte, Vienna, Austria.  
Prof. Riccò, University of Catania, Sicily, Italy.  
Prof. G. B. Rizzo, University of Messina, Sicily, Italy.  
Mr. A. L. Rotch, Blue Hill Meteorological Observatory, Cambridge, Mass., U.S.A.  
Sir Arthur Rücker, 19 Gledhow Gardens, London, S.W.